

PATENT ABSTRACTS OF JAPAN

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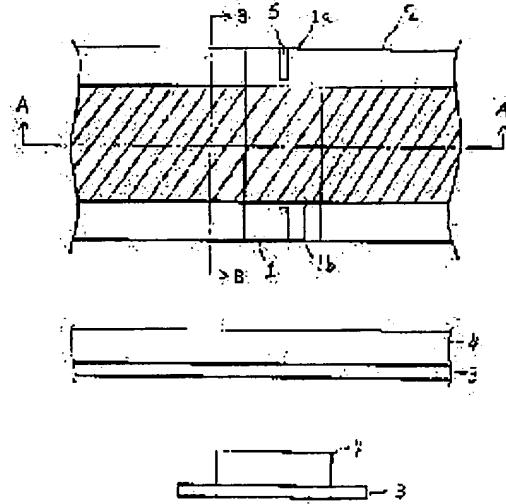
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(54) BATTERY TERMINAL CONNECTING PLATE

(57)Abstract:

PROBLEM TO BE SOLVED: To improve weldability to a battery and reduce electric resistance by composing a battery terminal connecting plate from welded parts each having a single material structure of a nickel material and a conductive part having a multiple material laminated structure of a nickel material and a copper material or aluminum material.

SOLUTION: A metal laminated sheet 2 for stamping a terminal connecting plate 1 is formed by pressure-welding a copper material plate 4 to the surface of a nickel material plate 3 such that its end parts are excluded, and the terminal connecting plate 1 is provided by means of stamping from the metal laminated sheet 2. The terminal connecting plate 1 comprises welded parts 1a each having a single material structure of the nickel material and a conductive part 1b having a multiple material laminated structure of the nickel material and the copper material, and a slit 5 is formed in each of the welded parts 1a. The terminal connecting plate 1 is used by being welded to an electrode terminal part of a battery and provided with the conductive part 1b composed by laminating the metal material having lower resistance than that of the nickel material, so that its output loss at the connecting plate part is reduced.



LEGAL STATUS

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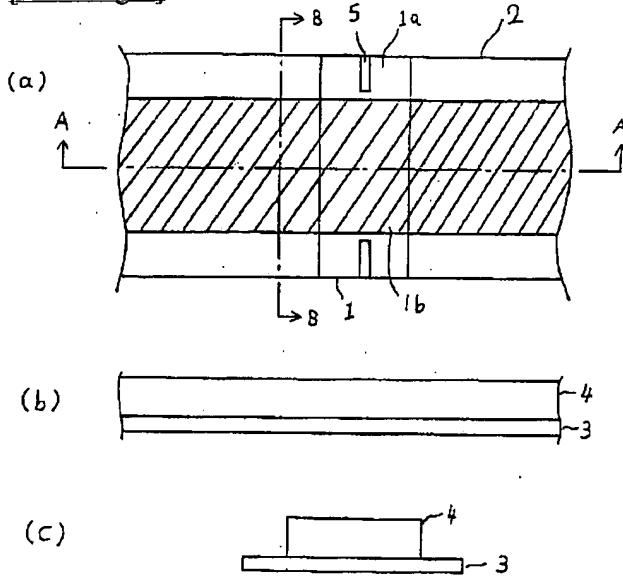
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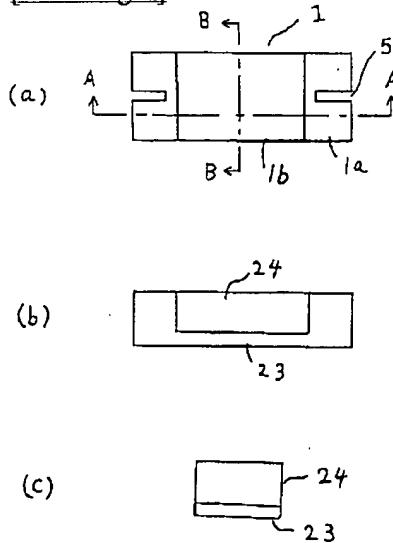
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DRAWINGS

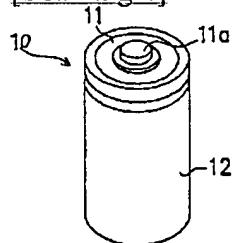
[Drawing 1]



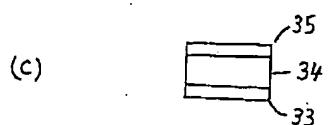
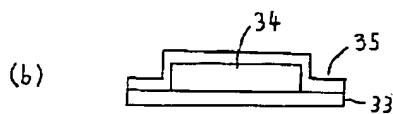
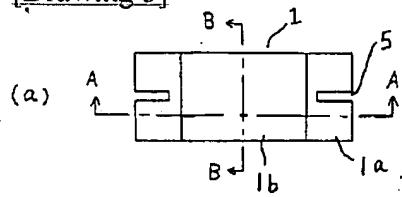
[Drawing 2]



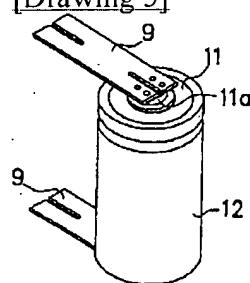
[Drawing 4]



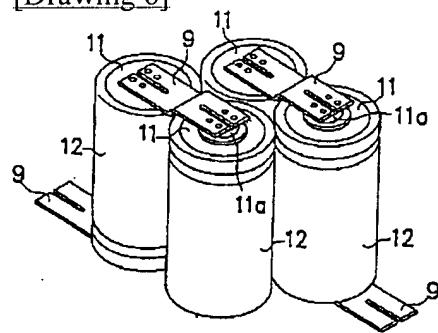
[Drawing 3]



[Drawing 5]



[Drawing 6]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the terminal strapping plate for cells used in order to weld to the electrode terminal area of the cell which constitutes for example, a group cell and to take the electrical installation between cells.

[0002]

[Description of the Prior Art] The nickel-cadmium battery which can be charged, the nickel hydride battery, and the lithium cell are widely used for the dc-battery power source of a portable equipment etc., beforehand, connection immobilization is carried out, or cell plurality is beforehand connected to a power circuit, and these cells are used for it by the application as a group cell.

[0003] For example, in the case of a cylindrical cell, it is the following, and is made and used. Drawing 4 is the whole perspective view showing the configuration of a cylindrical cell. As shown in this drawing, the cylindrical cell 10 plugged up with the lid 11 the end of the cell can 12 of the cylindrical shape which contained the cell ingredient through insulating packing, and has accomplished caulking *****. Moreover, height 11a is formed in this lid 11, and the relief valve for gas drainage is prepared in the interior of this height 11a. And by such cylindrical cell 10, the lid 11 which generally has height 11a serves as a positive electrode, and the wrap cell can 12 serves as a negative electrode in a circumferential side face and a base.

[0004] Drawing 5 is the whole perspective view showing the condition that the terminal strapping plate was attached on a cell in case connection immobilization is carried out and a cell is beforehand used for a power circuit. As shown in this drawing, spot welding of the end of the nickel plate 9 which is a terminal strapping plate with a thickness of 0.1mm - about 0.5mm, respectively is carried out to height 11a of the lid 11 by the side of a positive electrode, and the base of the cell can 12 by the side of a negative electrode, and a cylindrical cell is connected to a power circuit through these nickel plates 9.

[0005] Drawing 6 is the whole perspective view showing a configuration in case a cell is used as a group cell. As shown in this drawing, the nickel plate 9 which is a terminal strapping plate is passed between adjoining cells, spot welding of the both ends of this nickel plate 9 is carried out to height 11a of the lid 11 of both cylindrical cells, and the base of the cell can 12, and mutual connection is made.

[0006]

[Problem(s) to be Solved by the Invention] In order to gather the use effectiveness of a cell, it is required for a cell that the internal resistance should be low. Furthermore, when used for the application, for example, the power tool, and electric vehicle in a high current, not only a cell but the above-mentioned connection plate is expected for the resistance to be small as much as possible. This is because it becomes impossible to disregard the loss of power in a connection plate, when the flowing current becomes large.

[0007] Then, when using the above-mentioned nickel plate in order to reduce resistance of a terminal strapping plate for example, it will be necessary to thicken the board thickness but, and when the board thickness of a nickel plate became thick, the spot welding to a cell became difficult and there was a limit in thickening board thickness.

[0008] This invention is made in view of this situation, and aims to let the weldability to a cell offer a terminal strapping plate with small electric resistance good.

[0009]

[Means for Solving the Problem] The terminal strapping plate for the cells of this invention is a terminal strapping plate which is welded to the electrode terminal area of a cell and is used, and is characterized by consisting of a weld zone which has single ***** of nickel material, and a current carrying part which has two or more timber volume layer structure with nickel material, copper material, or aluminum material.

[0010] The weld zone is welded to the electrode terminal area of a cell, and is used, and the terminal strapping

plate of this invention plays the role with which this weld zone keeps weldability good, and plays the role with which the current carrying part which has two or more timber volume layer structure mainly passes a current in the state of low resistance. Since it has single ***** of nickel material, especially the terminal strapping plate of this invention fits the use to the cell with which the front face of the electrode terminal area of a cell is covered with nickel, and when the electrode terminal area of a cell consists of a nickel-plating steel plate especially, it is suitable.

[0011]

[Embodiment of the Invention] Drawing 1 is drawing for explaining the 1st operation gestalt of this invention. In this drawing, the A-A sectional view of the metal laminating sheet 2 and (c of the top view showing the metal laminating sheet 2 for (a) to pierce the terminal strapping plate 1 and (b)) are the B-B sectional views of the metal laminating sheet 2.

[0012] On the plate 3 of nickel material, the pressure welding of the plate 4 of copper material is carried out, and the metal laminating sheet 2 is formed so that that edge may be removed, and it pierces from this metal laminating sheet 2, and the terminal strapping plate 1 is obtained by processing. The terminal strapping plate 1 consists of weld zone 1a which has single ***** of nickel material, and current-carrying-part 1b which has two or more timber volume layer structure of nickel material and copper material, and has the structure where the slit 5 was formed at weld zone 1a.

[0013] Drawing 2 is drawing showing the structure of the terminal strapping plate which is the 2nd operation gestalt of this invention. In this drawing, (a) is [the A-A sectional view of the terminal strapping plate 1 and (c of the top view of the terminal strapping plate 1 and (b))] the B-B sectional views of the terminal strapping plate 1.

[0014] The terminal strapping plate 1 of this operation gestalt consists of weld zone 1a which has single ***** of nickel material, and current-carrying-part 1b which has two or more timber volume layer structure of the nickel material section 23 and ***** 24, and weld zone 1a and current-carrying-part 1b have the same thickness, a slit 5 prepares them in weld zone 1a, and it has *** structure.

[0015] Drawing 3 is drawing showing the structure of the terminal strapping plate which is the 3rd operation gestalt of this invention. In this drawing, (a) is [the A-A sectional view of the terminal strapping plate 1 and (c of the top view of the terminal strapping plate 1 and (b))] the B-B sectional views of the terminal strapping plate 1.

[0016] The terminal strapping plate 1 of this operation gestalt consists of a clad plate which put the plate 34 of aluminum material between two plates 33 and 35 of nickel material, and was produced, consists of weld zone 1a which has single ***** of nickel material, and current-carrying-part 1b which has two or more timber volume layer structure of three layers of nickel material and aluminum material, and a slit forms it in weld zone 1a, and it has *** structure.

[0017] Although the terminal strapping plate of this invention which has such structures [like] is welded to the electrode terminal area of a cell the same with having been shown in for example, above-mentioned drawing 5 and 6 and is used, since the metal material which has electric resistance lower than nickel material is equipped with current-carrying-part 1b which comes to carry out a laminating, compared with the conventional terminal strapping plate, the loss of power in a connection plate part is reduced.

[0018] For example, the nickel hydrogen cylinder cell by which a lid and a cell can consist of a nickel-plating steel plate is connected to a 240 cel serial. When it discharges by current value 100A, connection of 240 cels Width of face of 10mm, die length of 30mm, When that output voltage was 242V when the conventional terminal strapping plate which consists of nickel material with a thickness of 0.2mm was used used the terminal strapping plate of the operation gestalt of the isomorphism-like above 2nd, output voltage improved with 258V. In addition, the thickness of ***** 24 of current-carrying-part 1b in the terminal strapping plate of this operation gestalt set thickness of 0.15mm and the nickel material section 23 to 0.05mm. Moreover, about weldability, it was the same as the conventional thing.

[0019] Although the above explanation explained the case where copper was used as laminated-structure material, even if it changes to copper and uses aluminum, it is the same, and it is also possible to double and use copper and aluminum. In addition, nickel material, copper material, and aluminum material are not restricted to 100% of thing. Moreover, it is also possible for a laminated structure not to be restricted to two-layer, but to consider as the structure of three or more layers, and such a laminated structure can be formed with a pressure-welding method or plating. Furthermore, although welding is not limited to resistance welding, the terminal strapping plate of this invention is suitable especially when welded using resistance welding, and when nickel is formed in the electrode terminal area front face, it is suitable [plate] further.

[0020]

[Effect of the Invention] According to this invention, the small terminal strapping plate of electric resistance

with the good and weldability to a cell is obtained, and the output of a cell can be efficiently taken out by using this.

[Translation done.]